7905

Beam Power Tube

9-PIN MINIATURE TYPE

Quick-Heating-Filament Type for Mobile-Communications Equipment

GENERAL DATA

Electrical:

Filament, Coated:

Voltage (AC or DC)	6.3 ± 10%	volts

When operated from storage-battery systems, the filament may be subjected to voltage variations as great as ± 20 per cent. Although such extremes in filament voltage may be tolerated for short periods, increased equipment reliability can be achieved with improved supply-voltage regulation.

Current at 6.3 volts	0.65	amp
Heating time	Less than 1 second	
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.14 max.	pf
Grid No.1 to filament, grid No.3, and grid No.2	8.5	pf
Plate to filament, grid No.3, and grid No.2	5.5	pf

Characteristics, Class A_1 Amplifier:

Plate Voltage	200	volts
Grid No.3	*Connected to pin 1 at socket*	
Grid-No.2 Voltage	185	volts
Grid-No.1 Voltage	-6	volts
Mu-Factor, Grid No.2 to Grid No.1	11.5	
Transconductance	6700	μmhos
Plate Current	36	ma
Grid-No.2 Current	2.5	ma

Mechanical:

Operating Position	Vertical, base up or down, or Horizontal with pins 2 and 8 in vertical plane
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

Basing Designation for BOTTOM VIEW. 9PB

Pin 1 - Filament (-)
Pin 2 - Grid No.1
Pin 3 - Grid No.2
Pin 4 - LC (See NOTE)
Pin 5 - LC (See NOTE)
Pin 6 - Plate
Pin 7 - Grid No.3
Pin 8 - Grid No.2
Pin 9 - Filament (+)

NOTE: May be used only under conditions specified in *Operating Considerations.*

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy[b]
and
RF POWER AMPLIFIER — Class C FM Telephony

Maximum ICAS[c] **Ratings,** *Absolute-Maximum Values:*

	Up to 175 Mc	
DC PLATE VOLTAGE.	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to pin 1 at socket*	
DC GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	300 max.	volts
DC GRID-No.2 VOLTAGE.	250 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE . . .	-125 max.	volts
DC PLATE CURRENT.	60 max.	ma
DC GRID-No.2 CURRENT.	10 max.	ma
DC GRID-No.1 CURRENT.	5 max.	ma
PLATE INPUT	18 max.	watts
GRID-No.2 INPUT	1.5 max.	watts
PLATE DISSIPATION	10 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface).	225 max.	°C

Typical ICAS[c] **Operation:**[d]

	As amplifier at 175 Mc		
DC Plate Voltage.	300	300	volts
Grid No.3	*Connected to pin 1 at socket*		
DC Grid-No.2 Voltage[e]	160	185	volts
DC Grid-No.1 Voltage[f] from a grid-No.1 resistor of 18,000 ohms	-36	-39	volts
Peak RF Grid-No.1 Voltage	41	43	volts
DC Plate Current.	50	60	ma
DC Grid-No.2 Current.	2.5	4	ma
DC Grid-No.1 Current (Approx.).	2	2.2	ma
Driving Power[g] (Approx.).	1	1	watt
Useful Power Output[h] (Approx.).	5.5	7	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	0.1 max.	megohm

PLATE MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1

Maximum ICAS[c] Ratings, *Absolute-Maximum Values:*

	Up to 175 Mc	
DC PLATE VOLTAGE	250 max.	volts
GRID No.3	*Connect to pin 1 at socket*	
DC GRID-No.2 VOLTAGE	250 max.	volts
DC GRID-No.1 VOLTAGE	-125 max.	volts
DC PLATE CURRENT	60 max.	ma
DC GRID-No.2 CURRENT	10 max.	ma
DC GRID-No.1 CURRENT	5 max.	ma
PLATE INPUT	15 max.	watts
GRID-No.2 INPUT	1.4 max.	watts
PLATE DISSIPATION	7 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	225 max.	°C

Typical ICAS[c] Operation:[d]

	At 175 Mc	
DC Plate Voltage	250	volts
Grid No.3	*Connected to pin 1 at socket*	
DC Grid-No.2 Voltage[j]	250	volts
DC Grid-No.1 Voltage[f] from a grid-No.1 resistor of 33,000 ohms	-70	volts
Peak RF Grid-No.1 Voltage	75	volts
DC Plate Current	60	ma
DC Grid-No.2 Current	2.5	ma
DC Grid-No.1 Current (Approx.)	2.1	ma
Driving Power[g] (Approx.)	1	watt
Useful Power Output[h] (Approx.)	6.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	megohm

FREQUENCY MULTIPLIER

Maximum ICAS[c] Ratings, *Absolute-Maximum Values:*

DC PLATE VOLTAGE	300 max.	volts
GRID No.3	*Connect to pin 1 at socket*	
DC GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
DC GRID-No.2 VOLTAGE	250 max.	volts
DC GRID-No.1 VOLTAGE	-125 max.	volts
DC PLATE CURRENT	50 max.	ma
DC GRID-No.2 CURRENT	10 max.	ma
DC GRID-No.1 CURRENT	5 max.	ma
PLATE INPUT	15 max.	watts
GRID-No.2 INPUT	1.5 max.	watts
PLATE DISSIPATION	10 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	225 max.	°C

Typical ICAS[c] Operation:

As doubler to 175 Mc

DC Plate Voltage	250	300	volts
Grid No.3	*Connected to pin 1 at socket*		
DC Grid-No.2 Voltage[e]	200	215	volts
DC Grid-No.1 Voltage[f] from a grid-No.1 resistor of 53,000 ohms	-53	-80	volts
Peak RF Grid-No.1 Voltage	60	87	volts
DC Plate Current	45	50	ma
DC Grid-No.2 Current	3.4	3.4	ma
DC Grid-No.1 Current (Approx.)	1	1.5	ma
Driving Power[g] (Approx.)	0.4	0.5	watt
Useful Power Output[j] (Approx.)	2.5	3.5	watts

As tripler to 175 Mc

DC Plate Voltage	250	250	volts
Grid No.3	*Connected to pin 1 at socket*		
DC Grid-No.2 Voltage[e]	180	225	volts
DC Grid-No.1 Voltage[g] from a grid-No.1 resistor of:			
50,000 ohms	-90	-	volts
60,000 ohms	-	-108	volts
Peak RF Grid-No.1 Voltage	105	118	volts
DC Plate Current	40	50	ma
DC Grid-No.2 Current	2.5	3.4	ma
DC Grid-No.1 Current (Approx.)	1.8	1.8	ma
Driving Power[g] (Approx.)	0.4	0.6	watt
Useful Power Output[h] (Approx.)	1.4	2	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	megohm

[a] Without external shield.

[b] Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

[c] Intermittent Commercial and Amateur Service.

[d] Pins 4 and 5 at rf ground.

[e] Obtained preferably from a separate source or from the plate-voltage supply with a voltage divider. If a series resistor is used, it should be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are completed.

[f] Obtained from a grid-No.1 resistor, or from a combination of grid-No.1 resistor and either fixed supply or cathode resistor. The combination of grid-No.1 resistor and fixed supply has the advantage of not only protecting the tube from damage through loss of excitation but also of minimizing distortion by bias-supply compensation.

[g] Driving power includes circuit losses and is the actual power measured at the input to the grid circuit.

[h] Measured at load.

[j] Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor. It is recommended that this resistor be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are made.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Filament Current.	1	0.59	0.71	amp
Transconductance.	1,2	5700	–	μmhos
Plate Current	1,2	27	52	ma
Plate Current	1,3	–	75	μa
Grid-No.2 Current	1,2	–	5	ma
Reverse Grid-No.1 Current	1,4	–	1	μa
Leakage Resistance:				
Between grid No.1 and all other electrodes tied together.	1,5	100	–	megohms
Between plate and all other electrodes tied together. . . .	1,6	100	–	megohms

Note 1: With 6.3 volts dc on filament.

Note 2: With dc plate volts = 200, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 185, and dc grid-No.1 volts = -6.

Note 3: With dc plate volts = 200, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 185, and dc grid-No.1 volts = -36.

Note 4: With dc plate volts = 215, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 215, and dc grid-No.1 resistor = 0.1 megohm.

Note 5: With grid No.1 100 volts negative with respect to all other electrodes tied together.

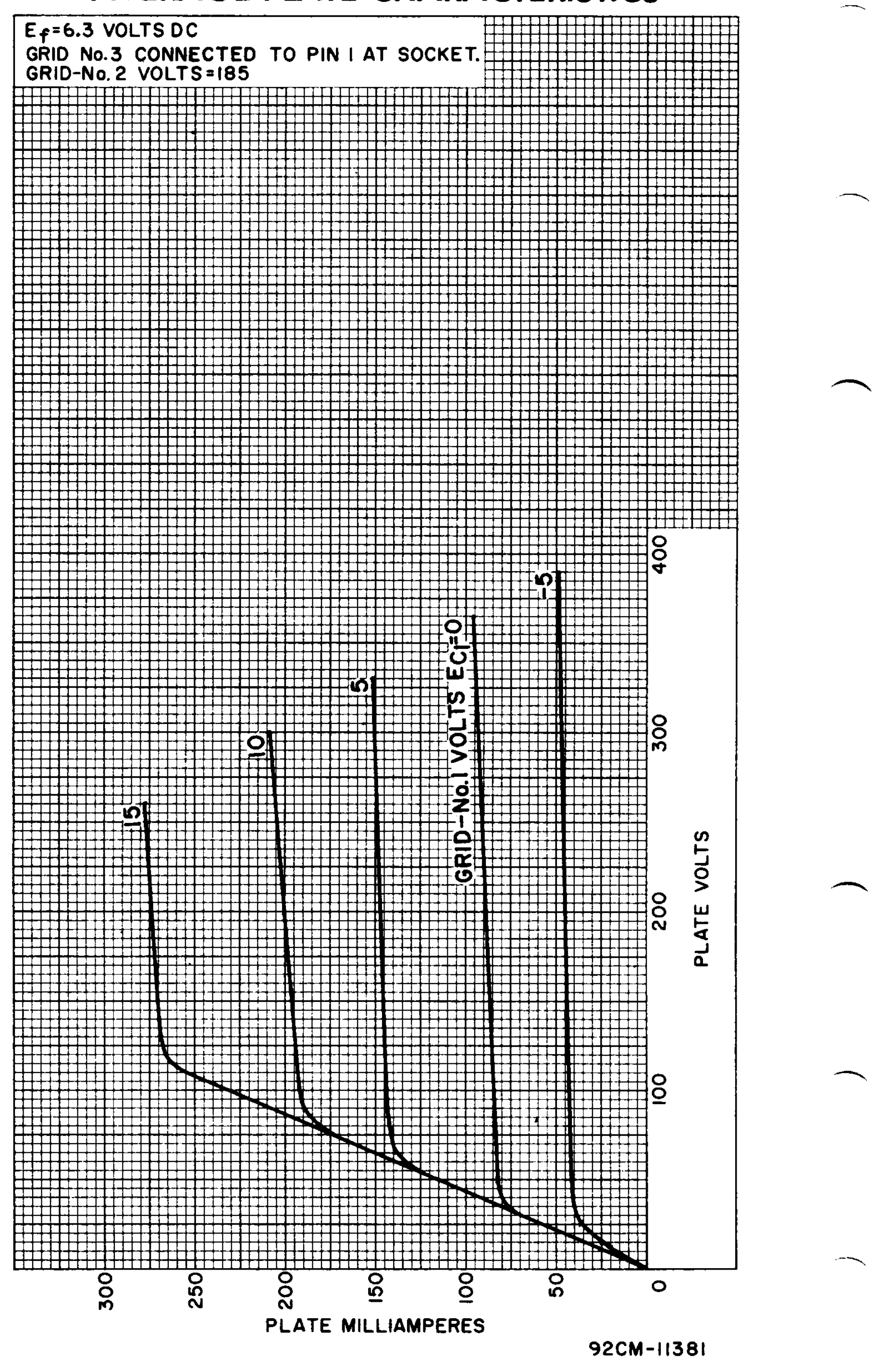
Note 6: With plate 300 volts negative with respect to all other electrodes tied together.

OPERATING CONSIDERATIONS

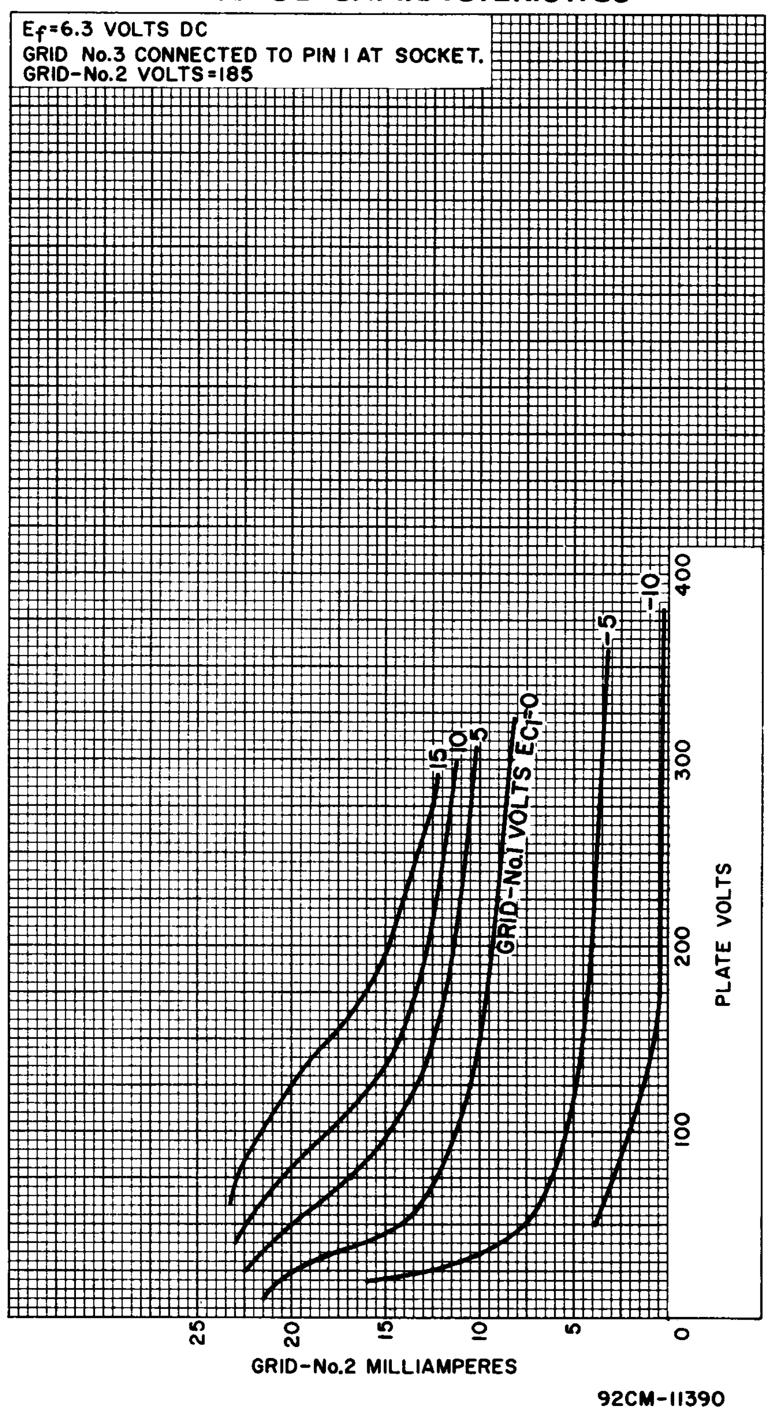
The socket connections to pins 4 and 5, which are designated LC on the basing diagram, may be used to minimize the absorption of rf power in the filament circuit by connecting pins 4 and 5 to ground through a capacitor, close to the socket. Pin 1 is directly grounded and pin 9 is bypassed by using a feedthrough capacitor when bringing this filament lead through the chassis.

Shielding of the 7905 may be used in "straight-through" rf amplifier service to minimize external feedback from the plate to grid No.1. A grounded shield crossing the terminal end of the tube socket through the space between pins 2 and 3 and the space between pins 8 and 9, is generally adequate for this purpose. No shielding is necessary for either frequency doubler or tripler operation.

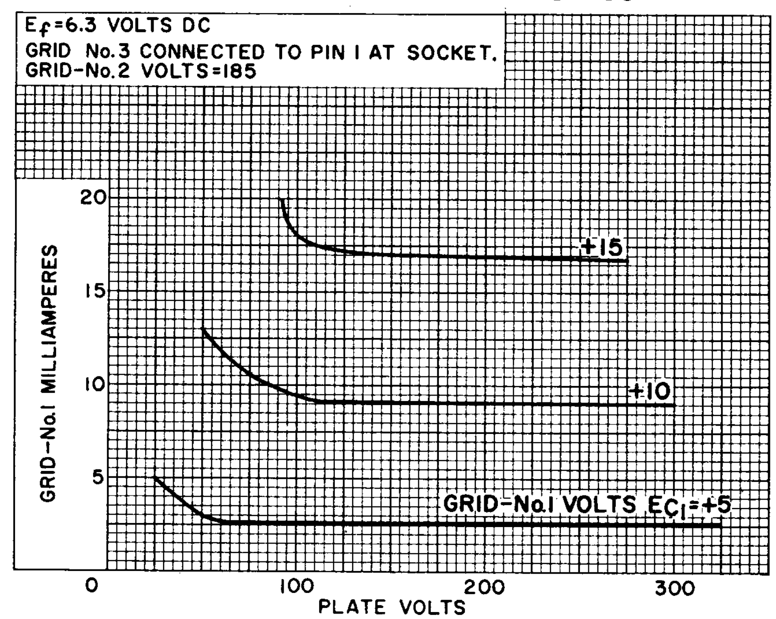
AVERAGE PLATE CHARACTERISTICS



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